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MYODOPSYLLA SETOSA AND TIARAPSYLLA BELLA,
NEW SPECIES OF FLEAS FROM PERU

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Although twenty species of fleas have been described from Peru, the specimens were collected during only a small number of surveys, and it is likely that the forms described below represent but a small percentage of undescribed species still to be found in Peru. Included in the present paper are descriptions of two new species representing two families of Siphonaptera, and records and a short redescription of *Tiarapsylla titschacki* Wagner, 1937. The specimens of *T. titschacki*, taken by Dr. C.C. Sanborn, constitute the first records of this species since the type collection.

I am grateful to Mr. F.G.A.M. Smit of British Museum (Tring) who generously lent a pair of *Myodopsylla isidori* (Weyenbergh, 1881) for study. The drawings of *M. isidori* are taken from the male of this pair *ex Myotis nigricans*, Argentina, Patagonia, Rio Colorado. Drawings of *M. wolffsohni* subsp. were taken from a specimen *ex* "various bats", Paraguay, Sapucay, 1901, W. Foster collector.

Ischnopsyllidæ: Ischnopsyllinæ

Myodopsylla setosa, new species
(figs. 1,2,6,8,10,12,13)

TYPE DATA. - Male holotype, female allotype *ex* "bat", Peru: Yucay, 29 Dec. 1937, J. Soukup collector. Deposited in the collections of the United States National Museum.

DIAGNOSIS. - Near *Myodopsylla isidori* (Weyenbergh, 1881) and *M. wolffsobni* subsp. Male separable from *Myodopsylla wolffsobni* and *M. isidori* in having distinct false combs on abdominal terga one through three (fig. 6); not with false combs only on terga one and two (figs. 3 and 5). Further separable from *wolffsobni* in that the posteroventral extension of the immovable process of the clasper is long, with dorsal and ventral margins parallel (fig. 13, P.); not with this portion of process broad and subtriangulate (fig. 11, P.); and by the shape of the distal arm of the ninth sternum and the dorsal extension of the crochet (figs. 2, 4, DA.9 and CR.); in *setosa* n. sp. the crochet bears a narrow, pointed apical process, whereas *wolffsobni* lacks this process. Male further distinct from *isidori* in that the posteroventral extension of the immovable process of the clasper is about the same width as the dorsal process (fig. 13, P.) not markedly narrower than dorsal extension (fig. 9, P.); and the two apical bristles on posteroventral process very long and "coiled" apically in *setosa* n. sp., not much smaller and lacking the apical curl as in *isidori*; also the crochet with triangular lobe just below dorsoapical extension (fig. 2, CR.), not with this lobe rectangular (fig. 7, CR.). Female separable from *wolffsobni* in having a distinct false comb on tergum three, not lacking such a comb. Apparently no valid differences are to be found separating *setosa* n. sp. females from *isidori* females.

DESCRIPTION

HEAD (fig. 1): Much as in other members of the genus. Pale area on frons with a row of small bristles which become minute as they progress anteroventrally. A row of three large bristles along anterior margin of antennal groove, bristle just above eye much the largest; other than these, with several small scattered bristles between antennal groove and pale area of frons. Eye vestige visible but pale in color. Second antennal segment with apical row of small bristles.

THORAX (fig. 8): Mesepisternum (MPS.) with anterior margin almost vertical, not strongly inclined anteriorly; mesepisternal rod (EP.R. - I) quite distinct. Metanotum (MTN.) with false comb of seven or eight close-set flattened bristles on a side. Lateral metanotal area (L.M.) with one large median bristle plus a small bristle near ventral margin. Metepimere (MTM.) with eight or nine bristles set in three irregular rows, bristles of first row small, last row of two medium-sized bristles inserted on posterior margin of sclerite.

ABDOMEN: First tergum (fig. 6, IT.) with well-developed, false comb of six or seven bristles on a side. Terga two and three in male also with distinct

false combs of four to five bristles on a side (fig 6, 2T. and 3T.); in female false comb on tergum three represented by only three or four flattened bristles on the two sides together.

MALE (fig. 10): Antesensilial bristle (A.B.) set on small protuberance, dorsally this protuberance no longer than width of bristle base. Sensilium (SN.) ovate viewed laterally, lacking a posterolateral extension occurring in certain other species of this genus. Eighth tergum (8T.) with marginal bristles as follows: dorsal margin with six or seven small pale bristles inserted on mesal surface, plus two larger submarginal bristles on lateral surface; at posterodorsal angle and just ventrad to this angle with three long bristles and two small pale bristles between the dorsal and the median long bristles; below large bristles a row of six or seven pale bristles which are twice as long as pale bristles on dorsal margin. Below bristles, the apical (posterior) margin of eighth tergum is distinctly serrate its entire length. Basal portion of eighth sternum (8S.) roughly square, anterodorsal angle rounded, posterodorsal angle acute, posterior margin slightly concave; ventrocaudal process of eighth sternum lightly sclerotized, with several pale lateral bristles ventroapically; two "brushes" of mesal bristles. Distal arm of ninth sternum (DA.9 and fig.2) with rounded apex; bearing three equidistant bristles on or near posterior (ventral) margin as follows: just below apex a small submarginal bristle followed by narrow wing-like extension which extends to largest bristle which is halfway between small subapical bristle and medium-sized bristle present ventrally on a narrow lobe. Immobile process of clasper (P. and fig. 13) with posteroventral extension rectangular, more than two times as long as broad, dorsal and ventral margins parallel and straight, width of posteroventral extension about the same as width of dorsal extension of process, the two apical large bristles on posteroventral extension flagellate, coiled apically. Moveable finger (F. and fig. 13) triangular, dorsal angle acute, posteroventral angle of about 90°. Aedeagal apodeme (A.E.A.) about five times as long as broad, apex acute. Penis rods (P.R.) forming a complete circle. Crochets (fig. 2, CR.) divided into two processes, the upper process with narrow acute dorsoapical extension, below this a subtriangular lobe; lower process with caudally expanded apex.

FEMALE (fig. 12): Similar to modified segments of related species. Spermatheca (SP.) and seventh sternum (7S.) as shown in figure.

LENGTHS: Holotype 2.4mm., allotype 2.3mm.

Stephanocircidæ: Craneopsyllinæ

Tiarapsylla bella, new species (figs. 15-17, 19)

TYPE DATA. - Holotype female, three paratype females *ex* "*Felis pajaros garleppi*" (*Felis colocolo garleppi*), Peru: Dept. of Puno, Picotani, 22 Sept. 1941, C.C. Sanborn collector. Holotype female deposited in the collections of the Chicago Natural History Museum, two paratype fe-

males in collection of Robert Traub, remaining paratype female in the collections of British Museum (Natural History), Tring.

Felis colocolo is undoubtedly an abnormal host, the true host probably being *Lagidium* (viscacha) as with *T. titschacki* Wagner 1937. The cat from which the type specimens of *T. bella* were taken was observed hunting viscachas at the time of capture.

DIAGNOSIS. - Separable from *Tiarapsylla argentina* Jordon, 1942 in lacking an entire row of pale pseudosetae on inner aspect of mesonotal flange, the pseudosetae being only three or four in number on the two sides together and confined to the dorsum of the flange (fig. 19, P.S.S.); and second antennal segment with fringe of long bristles extending well beyond apex of head; not lacking such bristles. Close to *T. titschacki* Wagner, 1937; some of the differences as follows: a larger flea (*bella*-5mm., *titschacki*-3.7-4.4mm.); helmet comb of *bella* n. sp. with base evenly convex, formed of eight or nine spines and ending well short of ventral head margin (fig. 16); not with ten to twelve spines (usually 11-12) in a sinuate row extending almost to ventral head margin (fig. 14). Small bristles on helmet posterior to the comb confined to area behind dorsal two spines in *bella* n. sp., not behind upper three or four spines as in *titschacki*. Second antennal segment with its apical flange longer than in *titschacki*, extending over basal two segments of antennal club.

DESCRIPTION

HEAD (fig. 16): Helmet comb of 8-9 spines, its base slightly convex, not markedly sinuate; the ventral spine separated from ventral margin of helmet by at least the width of its base. Posterior margin of helmet above comb with row of small bristles. Small bristles present on helmet posterior to upper two helmet spines. Postantennal area with five rows of bristles. First antennal segment with row of about six medium-sized bristles; second antennal segment with apical flange extending over basal two segments of club and with apical row of long bristles extending well beyond apex of club. Genal comb of six long, apically rounded spines; genal process above comb of varying size and shape, about as long as comb spines. Labial palpus two-thirds length of procoxa. Maxillary palpus with basal segment approximately two times as long as second segment.

THORAX (fig. 19): Pronotum (fig. 16, PRN.) with two rows of bristles, first row irregular, plus some anterior bristles; pronotal comb with 25-29 spines in all (holotype with 29 spines, paratypes with 25, 26 and 27 spines). Mesonotum

(MSN.) with five rows of bristles; first four rows very irregular; three or four dorsal pseudosetæ present under flange. Mesepisternum (MPS.) and mesepimere (MPM.) with approximately 30 bristles in all. Metanotum (MTN.) with three rows of bristles, first two rows scattered. Lateral metanotal area (L.M.) with 6-8 small and large bristles. Metepisternum (MTS.) with one large bristle. Metepimere (MTM.) with three scattered rows of bristles.

LEGS: Protibia with seven dorsal notches, including apical, bearing bristles as follows (base to apex): 2-2-2-4-4-4-4 (holotype); 2-2-2(3)-4(3)-4(5)-3(4,5)-4(5) (paratypes). Mesotibia with eight dorsal notches containing bristles as follows: 2-2-3-3-3-4-4-4 (holotype); 2-2-2(1)-3(4)-4(3)-4-4(3)-4 (paratypes). Metatibia also with eight dorsal notches containing bristles as follows 2-2-2-3-3-4-4-4 (holotype); 2-2-2-3(4)-3(4)-4(3)-4(3)-4 (paratypes).

ABDOMEN: First tergum (fig. 19, *IT.*) with three rows of bristles, first short; terga 2-6 with two rows of bristles, second row always extending below spiracle; seventh tergum with three rows, first row short. Basal sternum with clump of 5-6 ventral subapical bristles. Other unmodified sterna with one row of bristles, at times plus one or two anteroventral bristles. Holotype and two paratypes with two antesensillial bristles on each side, one paratype with two such bristles on one side, one on other.

MODIFIED SEGMENTS (fig. 17): Seventh sternum (7S.) with two rows of bristles; its posterior margin lacking sinus. Eighth tergum (8T.) lacking bristles above spiracle; an irregular row of bristles from just below spiracle to level of bursa copulatrix (B.C.); ventrally with two scattered rows of bristles and with a thick patch of dark subspini-form bristles apically, ventrad to ventral anal lobe; no more than one bristle present laterally between apical clump and anterior row. Dorsal and ventral anal lobes (D.A.L. and V.A.L.) with many small bristles. Anal stylet (A.S.) about two times as long as broad, with two or three short apical bristles, one of which may be longer than others. Spermatheca (SP. and fig. 15) with tail at least one and one-half times as long as body; body usually sharply rounded dorsally near insertion of tail; body and apical half of tail pigmented. Bursa copulatrix (B.C.) sinuate, narrow; ductus obturatus (D.O.) with basal third as thick as bursa, apical two-thirds narrow.

LENGTH: 5.0mm.

Tiarapsylla titschacki Wagner, 1937

(figs. 14, 18)

Tiarapsylla titschacki Wagner, 1937, Zeits. Parasit. 9:709, figs. 9-15.

Wagner, 1939, Aphanipt.:76, fig. 76.

TYPE DATA. - Type series: one male, two females *ex* "vizhaca", Peru: Tayapampa (Dept. of La Libertad, Tayabamba?), about 4,000m., 13 April 1936, E. Titschack collector.

NEW RECORDS. - One female *ex Lagidium peruanum* subsp., Peru: Dept. of Puno, Picotani, 14 Sept. 1941, C. C. Sanborn collector; in the collec-

tion of Robert Traub. One female *ibid.* but *ex Lagidium peruanum inca*, Dept. of Junin, Capilla, 22 kilom. from Carhuamayo, 16,000 ft., 19 Feb. 1946; in the collections of the Chicago Natural History Museum. DIAGNOSIS. - Separable from *Tiarapsylla argentina* Jordan, 1942 by lacking complete lateral row of mesonotal pseudosetæ and by presence of long bristles apically on second antennal segment. Distinct from *T. bella* n. sp. by characters given above in the diagnosis of the species.

DESCRIPTION

HEAD (fig. 14): Helmet comb with markedly sinuate margin; the spines numbering 10-12 (11-12 in the type specimens; present specimen from Puno with 11 spines on one side, 10 on the other; Junin specimen with 12 spines on both sides). Most ventral spine of helmet comb set very near ventral margin of helmet, distance from this margin to ventral comb spine less than one-half width of base of this spine. Small bristles posterior to helmet comb present opposite dorsal three or four spines of helmet comb. Genal comb of five or six spines, the spines proportionately shorter and more squared apically than in *T. bella* n. sp. Flange of second antennal segment not covering more than basal segment of club.

THORAX: Pronotal comb of 22-24 spines in all (specimens at hand with 22-23 spines). Remainder of thorax as in *T. bella* n. sp.; generally with somewhat fewer bristles.

LEGS and ABDOMEN with chaetotaxy similar to *T. bella* n. sp.

MODIFIED SEGMENTS, FEMALE: very similar to *T. bella* n. sp. Two or three antesensilial bristles (Puno specimen with three on both sides; Junin specimen with three on one side, two on the other.). Eighth tergum with vertical row of bristles below spiracle doubled part of its length and with several bristles scattered over an area between this row and the apical clump of bristles present on posterior margin just ventrad to ventral anal lobe. Spermatheca body (fig. 18) with dorsal margin broadly rounded or somewhat concave near insertion of tail; tail not more than one and one-half times as long as body.

LENGTHS. - Junin female 3.7mm.; Puno female 4.4mm.

LIST OF ABBREVIATIONS

A.A.R.	Aedeagal apodemal rod	PL.A.	Pleural arch.
A.B.	Antesensilial bristle.	P.R.	Penis rod.
AE.A.	Aedeagal apodeme.	PRN.	Pronotum.
A.S.	Anal stylet, female.	PS.S.	Pseudosetæ.
B.C.	Bursa copulatrix.	SN.	Sensilium.
CR.	Crochet.	SP.D.	Spermathecal duct.
D.A.L.	Dorsal anal lobe.	SQ.	Squamulum.

D.A.9	Distal arm of ninth sternum, male.	T.AP.9	Tergal apodeme of segment nine, male.
D.O.	Ductus obturatus, female.	V.A.L.	Ventral anal lobe.
E.F.	Proepisternal flange.	1T.	First abdominal tergum.
EP.R. - I	Mesepisternal rod.	2T.	Second abdominal tergum.
F.	Movable finger of clasper, male.	3T.	Third abdominal tergum.
FU. - I	Mesosternal furca.	4T.	Fourth abdominal tergum.
L.M.	Lateral metanotal area.	7S.	Seventh abdominal sternum.
MB.	Manubrium of clasper, male.	7T.	Seventh abdominal tergum.
MPM.	Mesepimere.	8S.	Eighth abdominal sternum.
MPS.	Mesepisternum.	8T.	Eighth abdominal tergum.
MSN.	Mesonotum.	9S.	Ninth abdominal sternum.
MST.	Mesosternum.	9T.	Ninth abdominal tergum.
MTM.	Metepimere.		
MTN.	Metanotum.		
MTS.	Metepisternum.		
MTT.	Metasternum.		
P.	Immovable process of clasper, male.		
PEG.	Peg of crochet, aedeagus.		

PLATE VII

- Fig. 1 *Myodopsylla setosa* n. sp.: Head and prothorax, holotype
Fig. 2 Ibid.: Distal arm of ninth sternum and crochet, holotype.
Fig. 3 *M. wolffsobni* subsp.: Abdominal terga 1-3, male.
Fig. 4 Ibid.: Distal arm of ninth sternum and crochet, male.
Fig. 5 *M. isidori* (Weyenbergh, 1881): Abdominal terga 1-3, male.
Fig. 6 *M. setosa* n. sp.: Abdominal terga 1-4, holotype.
Fig. 7 *M. isidori* (Weyenbergh, 1881): Distal arm of ninth sternum and
crochet, male.
Fig. 8 *M. setosa* n. sp.: Meso - and metathorax, holotype.

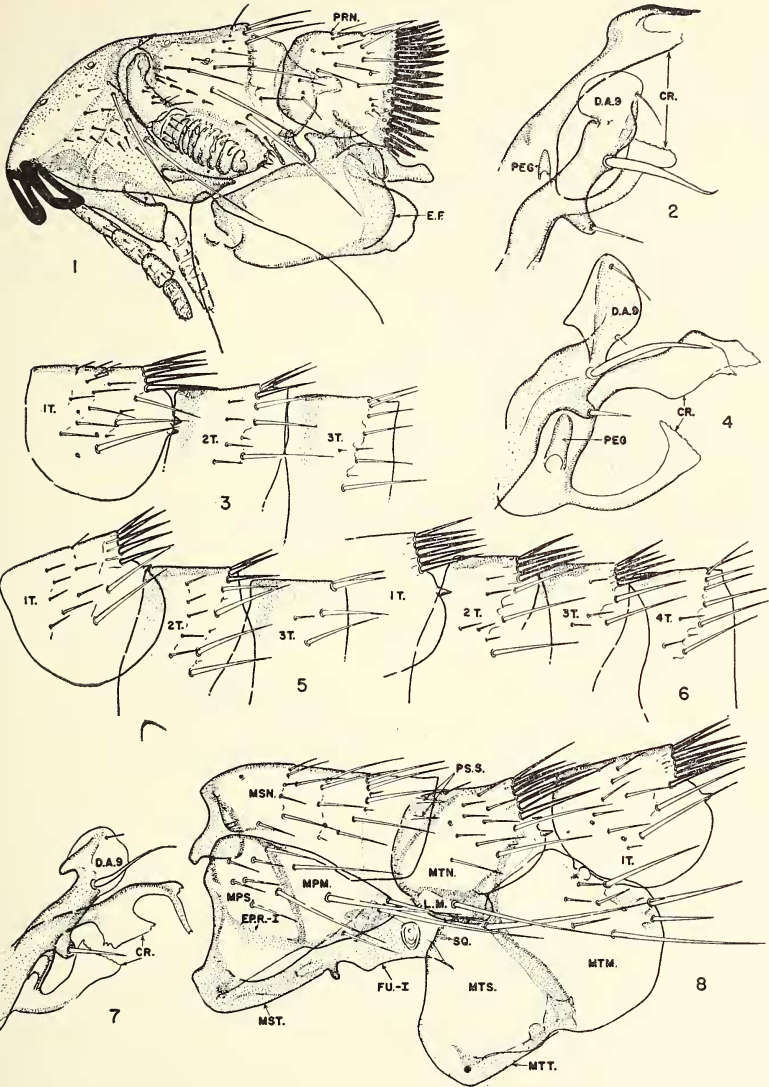


PLATE VIII

- Fig. 9 *Myodopsylla isidori* (Wegenberg, 1881): Process and movable finger of clasper, male.
- Fig. 10 *M. setosa* n. sp.: Modified segments, holotype.
- Fig. 11 *M. wolffsohni* subsp.: Process and movable finger of clasper, male.
- Fig. 12 *M. setosa* n. sp.: Modified segments, allotype.
- Fig. 13 *Ibid.*: Process and movable finger of clasper, holotype.

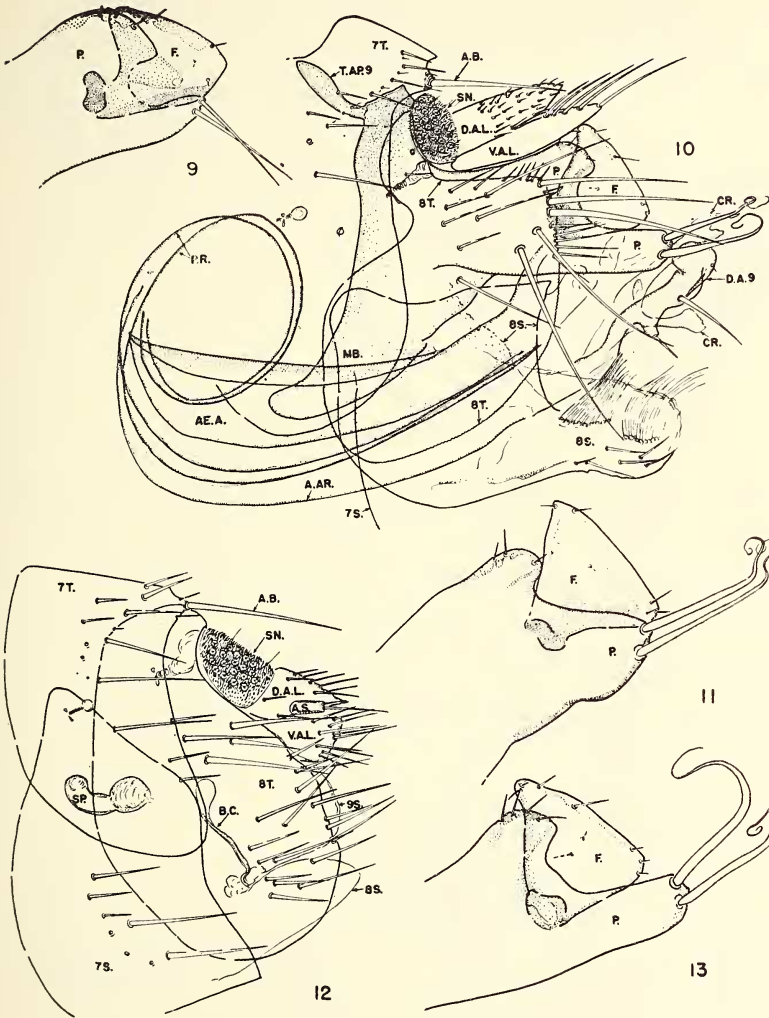


PLATE IX

- Fig. 14 *Tiarapsylla titschacki* Wagner, 1937: Head and prothorax, female
- Fig. 15 *T. bella* n. sp.: Spermatheca, holotype.
- Fig. 16 Ibid.: Head and prothorax, holotype.
- Fig. 17 Ibid.: Modified segments, holotype.
- Fig. 18 *T. titschacki* Wagner, 1937: Spermatheca.
- Fig. 19 *T. bella* n. sp.: Meso- and metathorax, holotype.

